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PACKAGING METHOD AND APPARATUSTechnical Field

The present invention relates to a packaging method and apparatus for the packaging of flowable product. The packaging method and apparatus of the present invention has been developed for use principally in the snack food industry, of the packaging of snack foods such as potato chips, pretzels and the like, and it will therefore be convenient to describe the invention as relating to that type of application. It should however be appreciated that the invention has wider application and is not to be considered as restricted to that application.

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Background Art

Snack foods such as those of the above type, are generally packaged in bags in high speed bagging machinery, in which a bulk supply of products to be bagged is weighed into discrete product charges, which are fed through an opening of a bag under gravity, which opening is subsequently sealed shut, such by heat welding. Various problems exist with these systems. These include the tendency for product streaming where individual pieces of the product charge separate during transfer. This results

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in the product charge not dispensing to the bags in a compact form and is largely a problem due to the weight and surface area characteristics between the full size product and smaller crumbs and the like in the charge. Generally, the heavier the particle, the faster it will fall and as a result, in the feed operations there is a tendency for the crumbs to lag behind the full size product. This tendency of the smaller portion lagging gives the phenomena known as crumb rain.

The problem of product streaming and associated problems of crumb rain limit the speed of the bagging operation. Furthermore often the smaller lighter particles are left behind and miss their intended packaging and either get caught up in the sealing area or fall back into the next product charge, thereby effecting the quality of the end product.

An aim of the present invention is to provide a method of packaging and associated apparatus which ameliorates this problem of product streaming provides a bagging system which is more efficient, which can operate at higher speeds and be easily incorporated into existing bagging operations.

Disclosure of the Invention

In a first aspect, the present invention relates to a packaging method where discrete product charges are dispensed from a bulk supply and are individually bagged. In its broadest term, the method of the invention is characterised in that the charge is dispensed from the bulk supply into a receptacle where it is conditioned for dispensing into the bag.

The method of the present invention provides significant advantages over previous packaging processes for food product. By being able to condition the product charge in its discrete form in the receptacle, prior to dispensing it to be bagged, the problem of product streaming, and the associated problem of crumb rain can be

minimised or substantially avoided.

In a particularly preferred form of the invention, the food product charge is placed under pressure in the receptacle. This conditioning of the product charge facilitates feeding of the charge into the bag by creating a pressure differential which, on release of the product charge from the receptacle, propels the product charge.

Preferably, the receptacle containing the product charge is sealed and pressurised above ambient pressure by the introduction of a gas. Once the pressure has reached a predetermined level, the receptacle is opened to the feed line of the bagging operation with the pressure differential between the interior of the receptacle and the outside pressure forcing the charge out of the receptacle into the feed line of the bag operation in a pulse form.

This arrangement provides substantial practical benefit. In particular, delivering the product charge to the bag in a pulse form, substantially increases the speed of operation as compared to gravity feed systems and also maintains the product charge in a compact form thereby minimising the tendency for product streaming.

The level of pressure applied to the product charge in the receptacle may vary depending on various factors in the packaging system such as the external pressure in the feed lines of the bagging operation, the length of the feed lines as well as the strength of the individual bags in which the product charge is to be dispensed. A particular advantage of the invention is that the pressure can be regulated to provide optimum flow characteristics.

Generally speaking, the higher the pressure, the faster the product charge will travel through the feed lines in a compact form. However, it is of course important that the pressure is not so excessive as to damage the product or the bag into which the product is dispensed. Preferably in an arrangement where the feed lines are at atmospheric pressure, the receptacle is pressurised in the order of 300 to 700 kPa. More preferably the product charge is pressurised in the order of 500 to 600 kPa.

Preferably nitrogen is included in the gas to pressurise the receptacle. The benefit of using nitrogen is that the gas can be transported with the product charge into the bag and remain in the sealed bag. The benefit of nitrogen is that it assists in keeping the food product fresh by limiting product oxidising within the sealed bag. However, it is to be appreciated that any other suitable gas may be used.

Preferably, the feed line to the bag is able to dissipate the pressure build up in the product charge. In a particularly preferred form, the feed line is vented. This is important as, without venting the feed line, it is difficult to maintain a pressure differential between the feed line and the product charge. Furthermore, the pressure pulse generated by the pressurising of the receptacle may not be able to dissipate properly causing back flow in the feed lines as the pressure pulse bounce back off the bottom of the bag or worse still, cause the bottom of the bag to blow out.

In one form, the product charge is conditioned by being vibrated in the receptacle prior to being dispensed for bagging. The advantage of this arrangement is that vibration of the food product charge will cause the lighter particles to work to the bottom of the receptacle. This conditioning of the product charges is ideal for a gravity feed system where the product is released from the bottom of the receptacle. The lighter particles will be at the front leading edge of the charge and will have a tendency to get pushed into the bag at the same speed as the heavier particles which are behind, consequently, the heavier particles will have a tendency to push the lighter particles into the bag thereby minimising the instances of product streaming and crumb rain.

In a further aspect, the present invention relates to a product packaging system including;

a dispensing arrangement for dispensing discrete product charges from a bulk supply;

5 a carriage including at least one receptacle for retaining a discrete product charge dispensed from the dispensing arrangement, the carriage further including a release mechanism for releasing the product charge from the receptacle; and

10 a bagging arrangement for receiving and bagging the product charge released from the receptacle.

According to this aspect of the invention, the packaging system is operative to condition the product charge in the receptacle prior to releasing the charge into the bagging arrangement.

15 In a particularly preferred form, the packaging system is configured such that the receptacle is able to be pressurised so as to enable the product charge to be released from the receptacle into the bagging arrangement under pressure.

20 In one form, the receptacle is brought into communication with a source of pressurised gas. The receptacle is sealed and the gas is then injected into the receptacle to pressurise the charge. Preferably the receptacle includes an outlet and the release mechanism includes a closure for predetermined opening and closing of the outlet. In this way, the release mechanism can be operated when the receptacle has reached that predetermined pressure with the product charge being forced out of the receptacle by the pressure
25 differential created between the ambient pressure and the pressure within the receptacle.

The carriage may be of any suitable form depending on the configuration of the overall packaging system. In one form, the packaging system includes a gravity feed. In this arrangement, the carriage includes an upper surface which
30 incorporates the or each receptacle. Each receptacle is open topped thereby enabling a product charge to be dispensed from the dispensing arrangement into the receptacle under gravity. It is to be appreciated that the invention may

be advantageously used in packaging systems which are not gravity fed. In particular, a benefit of forcing the product charge in the feed lines under pressure is that it provides sufficient motive force to transport the charge without requiring the assistance of gravity.

5 The carriage may be arranged such that the receptacle includes only one opening, which acts when the carriage is in one orientation as the inlet opening and in a second inverted orientation as an outlet. In this arrangement, the release mechanism is operable to move the carriage between an upright and inverted positions. However in a preferred form, the carriage is configured
10 such that the or each receptacle includes a separate inlet and outlet. Preferable the inlet is located in use, vertically above the outlet. In this arrangement, the outlet opening is required to be closed by suitable closure means so that the product charge received in the receptacle is retained therein against discharge through the outlet. The closure means includes part of the
15 release mechanism and may include a timing gate or the like to remain closed until the product is to be released from the receptacle. Mechanical or electro mechanical control mean may be employed to open the gate as required.

 Preferably there is relative movement between the carriage and various parts of the packaging system to effect the different operations involved, such
20 as dispensing of the product charge into the receptacle, and release of the product charge into the bagging arrangement. In one form, the carriage remains fixed and the various stations of the system are movable into and out of register with the carriage. However in a preferred form, the carriage provides a transport for the product charges between the various stations of the
25 packaging system. This simplifies the construction of the system and improves its overall efficiency.

 A further advantage is that movement of the carriage further conditions the product charge for feeding into the bag. Through the start stop movement of the carriage as it moves between various stations, the smaller particles in the
30 charged tend to settle to the bottom of the receptacle. This settling of the particles assists in minimising product streaming when the product is released

from the receptacle base as the heavy particles tend to push the smaller particles forward in transfer thereby minimising crumb rain.

Preferably the packaging system includes a plurality of discrete stations. These stations include the dispensing arrangement for dispensing the product charge into the receptacle, and one station to bag the product charge when dispensed from the receptacle. The packaging system may include further stations. In particular the system may include a facility to allow inserts to be added to the receptacle prior to the receipt of the product charge. In this way, the invention facilitates the inclusion of insert cards into the packaged product.

It is known that the weighers which control the dispensing of the discrete product charge can occasional discharge either an underweight or an overweight charge. To compensate for this preferably the packaging system includes a reject and recycling capability. Specifically, the packaging system includes a station which will remove the contents of the receptacle and feed it back into the bulk supply. Preferably the recycling station is in the form of a vacuum port. In a preferred arrangement, if the weigher registers an underweight or overweight charge, then a signal is sent to the packaging system to reject that product charge. This will trigger the packaging system not to release the product into the bagging station but rather travel to the recycling station where the vacuum port removes the product charge to be recycled into the bulk supply.

In a preferred form, the recycling station is located after the bagging station with each receptacle being caused to register with the recycling station on its return journey. With this arrangement, the normal operation of the packaging system, the vacuum in the recycling station is adapted to clean out each of the emptied receptacles as they index around the stations on their normal return journey to receive a subsequent charge.

Preferably the carriage includes a plurality of receptacles which are arranged to align with the different stations of the packaging system simultaneously. In this way, the system allows for multiple simultaneous operations which streamline the operation. A particularly preferred form, the

receptacles are disposed radially outwardly from a central axis about which the carriage rotates.

Preferably the bagging operation includes a feed line which is in the form of a tube or conduit. The tube has an inlet which is designed to register with the outlet of the or each receptacle. The conduit further includes at its distal end an open bag which is sealed along its bottom to effectively seal the distal end of the tube.

In a preferred form, the tube is vented to allow air to escape from within the tube prior to reaching the bag. The configuration allows for pressurised air in the pulse to escape during feeding of the product charge into the bag.

In one form, the bagging station includes an outer tube which is formed from the bagging material and which includes the bag at its lower end. An inner tube is located in spaced relationship to the outer tube to provide an annular space between the inner and outer tubes. The inner tube includes apertures which extend between an interior of the inner tube and the space. With this arrangement, the product charge is arranged to be fed through the interior of the inner tube with the pressure in the inner tube being able to vent through the apertures into the space as the product is transported into the bag.

Once the bag has received the product charge, the bagging station includes means to form a seal above the level of the product charge and to sever the bagged product from the elongate tube. Severing of the bag takes place along a line intermediate of the width of the second seal, so that the lower most end of the elongate bagging tube following severance of the just filled bag, is sealed for receipt and retention of the next product charge.

The packaging machine of the invention has various advantages of known packaging machinery. Firstly, by delivering the product charge in a pulse of pressurised gas, it enables faster bagging speeds partly as a result of reduction in product streaming but also in view of the accelerated passage of the product charge. The arrangement of the invention is also highly adaptable to twin bagger installations, which employ two separate bagging stations instead of a conventional single station. Normally, a twin bagging system requires path diverters to transfer the product charge from the supply station to

the respective bagger. The path diverters generally comprise an inclined trough and the product charge flows down the trough to the bagging station. This type of arrangement generates a substantial product streaming problem, with product remaining in the troughs and generating dust and also requiring slower operations of the machinery while the product flows the length of the trough as it separates.

The invention also reduces the area necessary to accommodate the relevant machinery of a twin bagger installation and while the capital cost is envisioned to be greater, the increased operating speed is considered to offset the initial cost in the relative short term.

Full control of the product throughout the operating procedure is a feature of the present invention and this serves overall to reduce a substantially eliminate product streaming, crumb rain, side discharge and product spillage.

Finally, a further advantage of the invention is that it can be easily incorporated to existing supply and packaging machinery.

In order to assist in arriving at an understanding of the present invention, a preferred embodiment is illustrated in the attached drawings. However, it should be understood that the following description is illustrative only and should not be taken in any way as a restriction on the generality of the invention as described above.

Brief Description of the Drawings

In the drawings:

Fig. 1 provides a schematic side elevation of a packaging machine; and

Fig. 2 is a schematic plan view of the packaging machine of Fig. 1.

Best Mode of Carrying out the Invention

As illustrated in the drawings, the packaging machine 10 includes a product supply station 11, a carriage 12 for transporting discrete product charges, a bagging station 13, a recycling station 14, and insert card acceptance station 15.

The product supply station 11 is represented only by a discharge chute 16 which receives a product charge from a bulk product supply normally located above the chute 16. However, for the purposes of this description, illustration of the chute only is sufficient.

The product charge received by the chute 16 may be a charge which has been weighed already and which is provided to the chute 16 simply for discharging therethrough, or alternatively the chute 16 may include a weighing facility itself. It is inconsequential to the present invention which system is adopted as either will suffice. All that is necessary is that a suitably sized charge of product be provided in the chute 16 and for example, this may be a charge of 10 gms, 50 gms, 200 gms etc.

The charge is held within the chute 16 by a gate arrangement 17 at the outlet 18 of the chute 16. The gate arrangement 17 can take any suitable form, although it is preferable that the gate comprise two hinged doors which open outwardly, allowing the product charge in the chute 16 to pass through the outlet 18 and into the carriage 12.

The carriage 12 is a flat cylindrical disc 19 and includes a plurality of receptacles 20. The receptacles comprise cavities cast or machined into the disc 19 and these cavities extend through the full thickness of the disc, so as to provide an inlet 21 and an outlet 22. The inlet 21 is permanently open and thus is ready to receive a product charge each time it moves into alignment with the outlet 18 of the discharge chute 16. The outlet 22 of the receptacles 20 are closed in order that a product charge received in a respective receptacle is retained therein.

The carriage 12 includes a partial housing 23. The housing has a base portion 24 which extends around the entire disc 19 and an upper portion 25 which extends over the bagging station 13. The disc 19 rotates within the housing 23 with the base portion 24 closing the outlet 22 to retain the product charge within the receptacles 20.

The disc 19 is rotatable about a central axis A by a drive shaft 26. The housing 23 supports the drive shaft 26. The rotatable nature of the disc 19 enables the receptacle to move into register with the different stations, 11, 13, 14 & 15.

On movement of the disc 19 from the supply station 11 to the bagging station 13, the upper surface of the disc registers with the upper portion 25 of

the housing 23. This causes the receptacle 20 located at the bagging station to be sealed off from the outside environment.

The upper portion 25 of the housing 23 includes an inlet 27 which is connected to a source of pressurised gas 28, which is preferably nitrogen, though other gas supplies can be used. The inlet 27 extends through the housing 23 and thereby communicates with the receptacle 20 located at the bagging station. Once the receptacle has moved into register in the bagging station, the gas supply is switched on so that gas is injected into the receptacle 20 to pressurise the receptacle which incorporates the product charge received from the supply station 11.

As mentioned above during rotation of the disc 19, the outlets 22 of the receptacles 20 are closed by the base portion 24 of the housing 23. However, the base portion 24 at the bagging station includes an aperture 29 incorporating a gate arrangement 30 which, when actuated to an open condition, exposes the outlet 21 of the receptacle 18, thus allowing discharge of the product charge from within the receptacle 18, through the outlet 21, into a filling tube 31 of the bagging station.

Pressurising of the receptacle 20 at the bagging station 13 establishes a pressure differential which when the gate arrangement 30 is opened causes the product to be propelled from the receptacle into the bagging conduit in a pulse form. To further increase the pressure differential at the gate arrangement 30, a vacuum source may also be provided to assist with the acceleration of the product charge out of the receptacle 18.

The filling tube 31 is formed from an inner and outer conduits (32 and 33 respectively). The conduits are spaced apart so as to form an annular space 34. Apertures 35 are located in the inner conduit 32 which extend between the interior 36 of the inner conduit 32 and the space 34. The outer conduit 33 is formed from bagging material that will ultimately form the envelope within which the product is packaged. Thus, the outer conduit 33 is an elongate tube which is sealed along a longitudinal seal line 37. Upon discharge of the product from within the respective receptacle 20, the product is driven downwardly through the interior 36 of the inner conduit 32 by gravity as

well as by the force generated by the pressure differential created at the gate arrangement 30. As the product charge travels through the conduit 32, the pressure pulse tends to dissipate by the gas venting through the apertures 35. The gas is then able to escape via the annular space 34 to be vented from the outer conduit 33.

Once the product has discharged into the base of the outer conduit 33, a heat seal is applied along a line above the product charge, such as that indicated by 37, with a thickness twice that required of each bag. The sealed bag is then severed from the conduit along a line 38 intermediate the thickness of the seal, so that the bag is separated from the conduit and a new base seal 39 is created. The conduit 33 is now ready to receive the next product charge.

The recycling station 14 includes a vacuum 40 having an inlet 41 arranged to register with the inlet 21 of the receptacle. The feed line 42 extends from the vacuum inlet 41 back into the bulk supply (not shown). The purpose of the recycling station is two fold. Firstly, it cleans the receptacles out after they have dispensed their charge into the bagging feed line. Secondly, they enable an overweight or underweight charge to be recycled.

The insert station 15 is located between the recycling station 14 and the dispensing station 11 and provides the facility to allow an insert card, or the like to be placed into the receptacle prior to inclusion of the charge. Alternatively, the packaging machine 10 can be arranged such that the insert card is located in a separate receptacle 20. In this arrangement the insert card is in one receptacle and the product charge is in an adjacent receptacle. When reaching the bagging station the contents of the adjacent receptacles are adapted to be dispensed into a single bag.

arrangement 30 is then opened causing the product charge to be dispelled from the receptacle in a pulse form. The product charge then passes in a compact form to the bag which is then sealed and severed from the outer conduit 33. If the dispensed charge is underweight or overweight the receptacle is caused to pass through the bagging station without opening of the gate. Once the receptacle has passed from the bagging station it then registers with the recycling station where the receptacle is cleaned prior to returning to the insert station to complete the packaging cycle.

For constructional purposes, the disc 19 can include any number of receptacles 20 and is governed by the size and speed required of the machinery. The machine 10 can also include more than one bagging station 13, to provide for example a twin bagging system. Where two bagging stations 13 are provided, they will preferably receive charges staggered from one another, from a single product supply station, although it is equally permissible to provide a plurality of supply stations.

Those skilled in the art will appreciate that there may be many variation and modifications of the configuration described herein which are within the scope of the present invention.

CLAIMS:

1. A packaging method where discrete product charges are dispensed from a bulk supply and are individually bagged, wherein the charge is dispensed from the bulk supply into a receptacle where it is retained prior to dispensing into a bag.

2. A packaging method as claimed in Claim 1, wherein the product charge is placed under pressure in the receptacle.

3. A packaging method as claimed in Claim 1 or 2, wherein the receptacle containing the product charge is sealed and pressurised above ambient pressure by the introduction of a gas.

4. A packaging method as claimed in Claim 3, wherein once the pressure in the receptacle has reached a predetermined level, the receptacle is opened to a feed line of a bagging station with the pressure differential between the interior of the receptacle and within the bagging station forcing the charge out of the receptacle into the feed line of the bagging station.

5. A packaging method as claimed in any one of Claims 2 to 4, wherein the receptacle is pressurised in the order of 300 to 700 kPa.

6. A packaging method as claimed Claim 5, wherein the pressurise is in the order of 500 to 600 kPa.

7. A packaging method as claimed in any one of Claims 3 to 6, wherein nitrogen is included in the gas to pressurise the receptacle.

8. A packaging method as claimed in any one of Claims 4 to 7, wherein the feed line to the bag has means to dissipate the pressure build up in the product charge.

9. A packaging method as claimed in Claim 8, wherein the feed line is vented.

10. A packaging method as claimed in any one of the preceding claims, wherein product charge is also conditioned by being vibrated in the receptacle prior to being dispensed for bagging.

11. A product packaging system to dispense discrete product charges to be bagged from a bulk supply, wherein a receptacle is provided to receive and retain a discrete charge prior to dispensing into a bagging arrangement.

12. A product packaging system as claimed in Claim 11, wherein the system includes a dispensing arrangement for dispensing discrete product charges from the bulk supply;

a carriage including at least one said receptacle for retaining the discrete product charge dispensed from the dispensing arrangement, the carriage further including a release mechanism for releasing the product charge from the receptacle; and

the bagging arrangement receives and bags the product charge released from the receptacle.

13. A product packaging system as claimed in Claim 12, wherein the packaging system is operative to also condition the product charge in the receptacle prior to releasing the charge into the bagging arrangement.

14. A product packaging system as claimed in any one of Claims 11 to 13, wherein the, or each, receptacle is

able to be pressurised so as to enable the product charge to be released from the receptacle into the bagging arrangement under pressure.

5 15. A product packaging system as claimed in Claim 14, wherein the receptacle is brought into communication with a source of pressurised gas, and the receptacle is sealed and means are provided to inject the gas into the receptacle to pressurise the charge.

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16. A product packaging system as claimed in any one of Claims 11 to 15, wherein the receptacle includes a release mechanism which includes a closure for predetermined opening and closing of the outlet.

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17. A product packaging system as claimed in any one of Claims 12 to 16, when dispensed on Claim 12, wherein the system includes a gravity feed and the carriage includes an upper surface communicating with the or each receptacle and each receptacle is open topped thereby enabling a product charge to be dispensed from the dispensing arrangement into the receptacle under gravity.

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18. A product packaging system as claimed in any one of Claims 11 to 17, wherein the bagging arrangement includes a feed line which is in the form of a tube or conduit which has an inlet which is designed to register with an outlet of the or each receptacle, and the tube or conduit further includes at its distal end an open bag which is sealed along its bottom to effectively seal the distal end of the tube.

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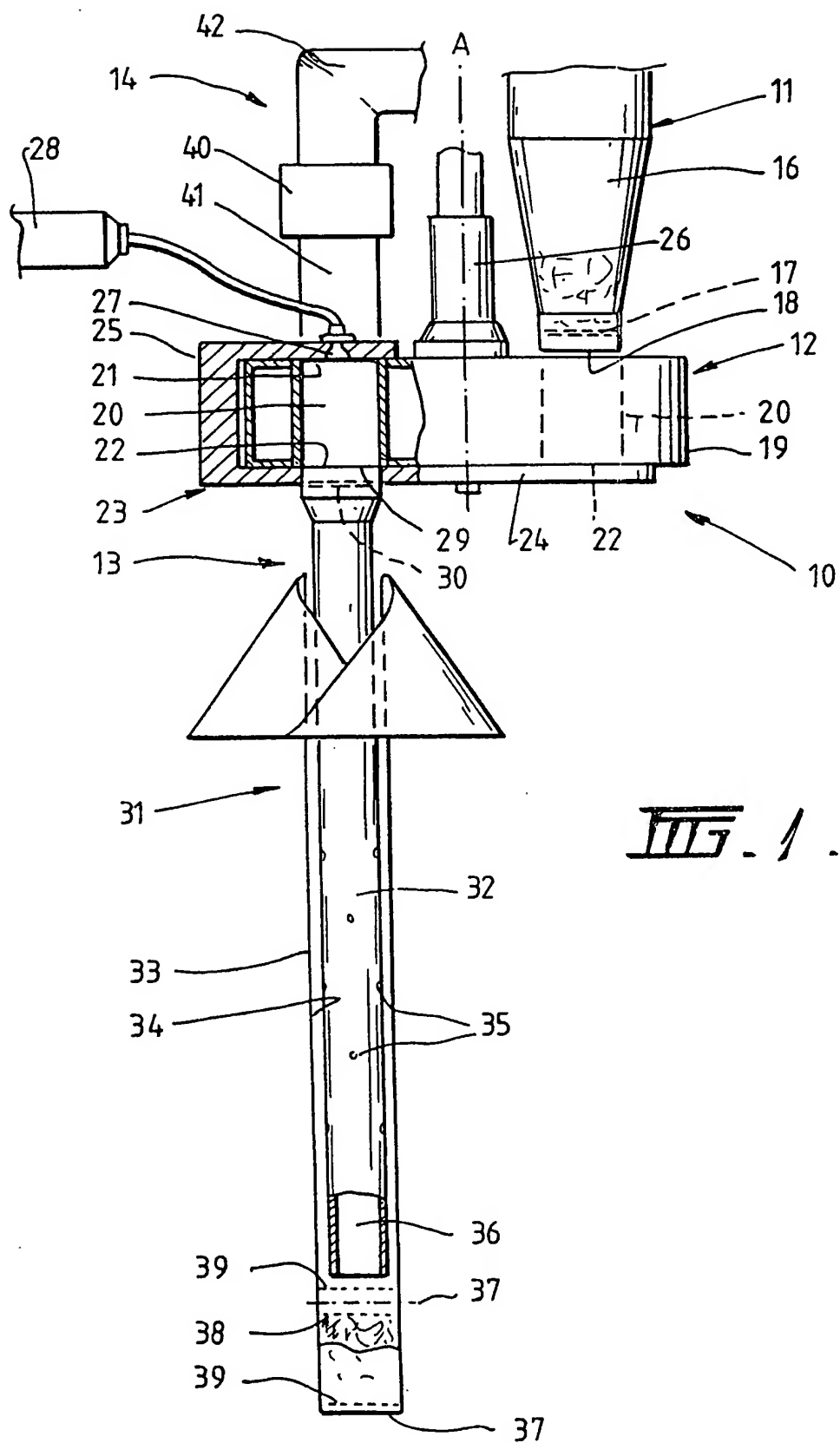
19. A product packaging system as claimed in Claim 18, wherein the tube is vented to allow air to escape from within the tube prior to reaching the bag whereby to allow for pressurised air to escape during feeding of the product charge into the bag.

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20. A product packaging system as claimed in Claim 19, wherein the bagging arrangement includes an outer tube which is formed from the bagging material and which includes the bag at its lower end, and an inner tube is located in spaced relationship to the outer tube to provide an annular space between the inner and outer tubes with the inner tube including at least one aperture which extends between an interior of the inner tube and the space, whereby the product charge is fed through the interior of the inner tube with the pressure in the inner tube being able to vent through the apertures into the space as the product is transported into the bag.

21. A packaging method as hereinbefore described with reference to the accompanying drawings.

22. A product packaging system as hereinbefore described with reference to the accompanying drawings.



SUBSTITUTE SHEET (Rule 26) (RO/AU)

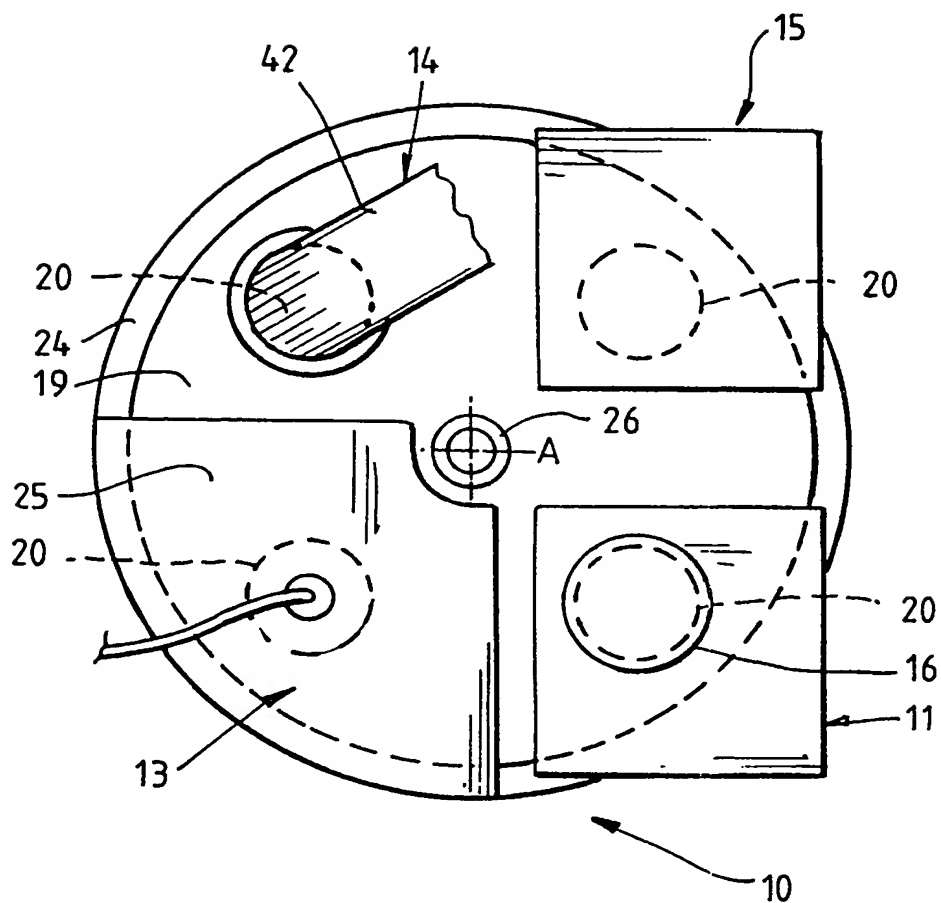


FIG. 2.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 99/00218

A. CLASSIFICATION OF SUBJECT MATTER		
Int Cl ⁶ : B65B 1/16, 37/14		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC: B65B 1/-, 37/-		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT: IPC + Keywords		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4640322 A (BALLESTER) 3 February 1987 whole document	1-20
P,X	US 5765606 A (TAKEMASA et al) 16 June 1998 whole document	1, 11-14, 16-18
X	US 5437393 A (BLICHER et al) 1 August 1995 whole document	1, 11-14, 16-18
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 21 April 1999		Date of mailing of the international search report - 4 MAY 1999
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer A. ALI Telephone No.: (02) 6283 2607

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00218

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2201949 A (CESTIND Srl) 14 September 1988 whole document	1, 11-14,16-18
X	EP 9943 A (DRUGPACK MACHINES LTD) 16 April 1980 whole document	1, 11-14,16-18
X	DE 3511288 A (ENGLER M MASCH GmbH) 2 October 1986 abstract, figure 1	1, 11-14,16-18
X	DE 2407714 A (SVENSKA CHOKLADFAB) 28 August 1975 abstract, figure 1	1, 11-14,16-18

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00218

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 21 and 22
because they relate to subject matter not required to be searched by this Authority, namely:
they do not comply with Rule 6.2 (a) of the PCT
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU 99/00218

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	5765606	CN	1131111	EP	719537	FI	956271
		JP	8183503	NO	955308	SG	38907
US	5437393	AU	56941/94	EP	683745	WO	9413536
GB	2201949	CH	672468	DE	3807794	IT	1207627
		JP	63317401	US	4870808		
EP	9943	ES	484564	GB	2033330	PT	70250
		WO	8000686				

END OF ANNEX